REMITTANCES, FDI, AND ECONOMIC GROWTH IN SOUTH ASIA: EVIDENCE FROM PANEL DATA

1. INTRODUCTION

In last few decades the private capital flow from developed to developing countries has been increasing at a significant rate. In 2000 the total net private capital flow to developing countries was $93 billion, which increased to $386 billion in 2009 and is estimated to be $603 billion in 2011 (United Nations, 2011). One of the primary reason for this increase is the overall economic growth across the world in the last decade. Recent world economic stagnation, however, may slow it somewhat, but given the emergence of rapid economic growth in many developing countries, it is likely to increase further. One of the major components of this private capital flow is the foreign direct investment (FDI). In the last two decades the FDI has grown faster than either the flow of trade or foreign aid.

Often it is argued that the FDI stimulates the economic development by complementing itself with the local economy of the host country (Trevino and Upadhyaya, 2003). In addition, FDI can increase economic growth by encouraging the incorporation of new inputs and foreign technologies in the production function of the host country (Dunning, 1993; Borensztein *et al*., 1998). FDI augments the level of knowledge in host country through labor training and skill acquisition (De Mello, 1997).

Most of the empirical studies have supported the above argument, i.e. FDI is growth enhancing to the host countries. For example, Borensztein *et al*. (1998) tested the effect of FDI on economic growth for 69 developing countries over two decades. Their findings suggest that FDI is an important vehicle for the transfer of technology and it contributes more to growth than the domestic investment. Their findings, however, also suggest that FDI is more effective tool of economic growth only in the countries where the level of education, a measure of its absorptive capacity, is high. Bosworth and Collins (1999) also conducted a comprehensive effect of FDI over 58 developing countries of Asia, Africa and Latin America for a period

from 1978 to 1995. Their empirical analyses indicated that a one dollar increase in capital inflow (all types) is associated with a fifty cents increase in domestic investment. Separately, FDI had a one-to-one dollar increase in domestic investment. A recent study by Trevino and Upadhyaya (2003), using pooled time series data from five developing Asian countries finds that FDI positively contributes to the economic growth of this region and in open economies the FDI's impact on economic growth is more effective than that of foreign aid.

In recent years, remittances have become another major source of external finance in many developing countries. In 2010 the total amount of remittances increased to $ 326 billion from only $ 2 billion in 1970. In India alone the total amount of remittances increased from little over $ 3 billion in 1989 to more than $ 50 billion in 2010 (World Bank, 2011). In recent years in many developing countries the remittances as a percentage of GDP has increased more than 20 percent. For example in 2010 total remittances were 22.9 % of GDP in Nepal and 11.8 % and 7.9 % respectively in Bangladesh and Sri Lanka. The size and the frequency of the flow of remittances are determined by several factors, which may include: the number of migrant workers, domestic wage rates and in the host country, economic activities in the host country and the sending country, exchange rates, political risk, level of education of the migrant, household income level etc.

In developing countries, most of the remittances are used to meet the basic necessities such as food, clothing, health care, child education, and buying (or constructing) housing and buying land. Some portion of the fund is also used for the investment in businesses, which includes all kind of businesses from investing in existing shops to transport businesses. Irrespective of the nature of expenses, remittances is expected to generate multiplier effect in the economy. How effective the remittances have been in improving the economies of the recipient country is an empirical question. Lately, there have been some studies in this regard. For example, Stahl and Arnold (1986) show that remittances spent on consumption have a positive multiplier effects on aggregate demand. Adelman and Taylor (1990) in their study show that in Mexico every dollar of remittances Mexico received, its output increased by about three dollars. Adams (1998, 2002) in his empirical study based on household survey data from Pakistan suggests that in Pakistan remittances resulted in higher savings and investments. Ratha (2003) emphasizes the importance of remittances as a source of external funds for developing countries and his empirical study finds remittances are the second largest source of external funding (first larges source being the foreign

direct investment) for these countries. Pradhan *et al.* (2008) used a sample of 39 countries developing countries panel data from 1980 to 2004 to study the effect of remittances on economic growth. Their empirical finding suggested that remittances have positive effect on economic growth.

Given the dearth of empirical study of the effectiveness of FDI and remittances on economic growth, this paper attempts to estimate the effect of external finance on economic growth in South Asia. Specifically, this paper attempts to analyze the effect of both the FDI and remittances on the economic growth in South Asia.

2. Fdi and remittances in South Asian countries

In the previous section we discussed the significance of FDI and remittances in South Asian countries. In this section we discuss the trend of the flow of FDI as well as remittances in the South Asian countries namely, Bangladesh, India, Pakistan and Sri Lanka for last twenty years (1990-2010). Table 1 presents the net flow of FDI as well as the FDI as percentage of GDP for different years for each country in our sample. Likewise Table 2 presents the flow of remittances as well as remittances as percentage of GDP for each country. All the figures are in real term (2000 US dollar).

Table 1 - *FDI and FDI as Percentage of GDP*

	Bangladesh		India		Pakistan		Sri Lanka	
Year	FDI in million US dollars	FDI as a percent of GDP	FDI in million US dollars	FDI as a percent of GDP	FDI in million US dollars	FDI as a percent of GDP	FDI in million US dollars	FDI as a percent of GDP
1990	4.0035	0.01358	292.58	0.108163	303.17	0.60334	53.59	0.54564
1995	2.0837	0.0057	2355.34	0.6795737	794.00	1.2603	61.53	0.48166
2000	280.38	0.59498	3584.22	0.7788695	308.00	0.416484	172.94	1.05899
2005	723.86	1.17905	6769.72	1.0503837	1958.89	2.07604	242.44	1.22204
2010	735.18	0.88598	19370.9	2.0106684	1621.24	1.396958	383.43	1.41858

Source: Author calculation from World Bank Data.
       GDP at 2000 Price.
       FDI at 2000 Price.

During the last three decades, the FDI flow has grown more rapidly than either trade flows or foreign aid (Trevino and Upadhyaya, 2003). One reason for such an increase in the flow of FDI is the

economic liberalization in these countries. Pakistan started its economic liberalization program in 1980 which was soon followed by Bangladesh, Nepal and Sri Lanka. India, however, started its economic liberalization policy in 1991. As we can see in Table 1 in Bangladesh the FDI flow increase more than two and half times in the last decade alone. We see a similar pattern in Pakistan and Sri Lanka as well. However, in case of Pakistan we see fluctuations in the flow of FDI in different years. Since one of the factor determining the inflow of FDI in the host country is the political risk it is not surprising that the multinational corporations are hesitant to invest in Pakistan. Presumably, that is the reason why we see a dip in FDI inflow in Pakistan in 2000 and 2010.

India is the largest economy in South Asia with a population of more than a billion people. It is also one of the fastest growing economies in the world. Obviously, it is a large market as well as abundant labor supply. In the recent decades the economy also has been liberalized. That is why India is one of the favorite destinations of multinational corporations. No wonder the FDI flow in India increased from 3.6 billion dollars (0.78 % of GDP) in 2000 to 19.6 billion dollars (2.01% of GDP) in 2010. Both market seeking as well as resource seeking FDIs are always attracted to those countries where the size of the market is big, resources are abundant in supply and are cheap and the economy is relatively free. This is the reason why we see an increasing flow of FDI in South Asia in last two decades.

TABLE 2 - *Remittances and Remittances as Percentage of GDP*

Year	Bangladesh		India		Pakistan		Sri Lanka	
	Remittance in million US dollars	Remittance as a percent of GDP	Remittance in million US dollars	Remittance as a percent of GDP	Remittance in million US dollars	Remittance as a percent of GDP	Remittance in million US dollars	Remittance as a percent of GDP
1990	962.76	3.26472	2907.17	1.0747595	2479.97	4.935362	495.40	5.043955196
1995	1320.35	3.61165	6745.32	1.9461875	1881.33	2.986182	867.82	6.793822068
2000	1967.53	4.17513	12738.25	2.7680899	1075.00	1.453638	1142.33	6.99493987
2005	3839.91	6.25463	19454.64	3.0185654	3806.53	4.034176	1751.96	8.831024868
2010	8701.10	10.4858	42530.53	4.4146068	7751.02	6.678731	3300.30	12.21011839

Source: Author calculation from World Bank Data.
        GDP at 2000 Price.
        Remittance at 2000 Price.

Table 2 presents remittances as well as remittances as percentage of GDP in our sample countries. As we see in the table the trend of

the remittance receipt of all the countries in South Asia is increasing. For example Bangladesh received little more than 900 million dollars remittances in 1990. This figure increased to 3.8 billion dollars in 2005 and 8.7 billion dollars in 2010. From 2000 to 2010 alone the remittance receipt in Bangladesh increased more than four times. In case of India, the total remittance receipt was 12.7 billion dollar in 2000 which increased by more than three times to 42.5 billion dollars in 2010. In case of Sri Lanka the total remittance receipt was 11.42 billion dollars in 2000 which increased almost three times to 33 billion dollars in 2010. Many Pakistanis historically have been working in the Middle-east and sending remittance money to Pakistan. But because of political problems in both Pakistan and Afghanistan in the 1990s the flow of emigrants from Pakistan to the Middle-east decreased during this period. That is the reason why we see a drop in remittance receipt of Pakistan in 1995 and 2000 in Table 2. However, after that period the amount of remittances in Pakistan has increased significantly which increased to 7.7 billion dollars in 2010.

Remittances as percentage of GDP clearly show that the economy of most of these countries are significantly dependent on remittances. This is particularly true in case of countries such as Bangladesh, Nepal (not in sample) and Sri Lanka. In all these countries remittances are one of the main source of foreign exchange and it accounts for more than 10 percent of GDP.

3. Theoretical background and methodology

In an economy the level of output is determined by the availability of factors of production. Using the Cobb-Douglass production function this can be written as:

$$y = AL^\alpha K^\beta \tag{1}$$

where y denotes the real output level (real GDP), K denotes the amount of domestic capital, and L denotes the amount of labor. α and β represent the contributions of the labor and capital respectively in the aggregate output and A is the efficiency parameter. Also it is assumed that both, α and β are less than one and the law of diminishing returns operates in both labor and capital inputs. Once we add foreign capital represented by FDI and remittances in equation (1) we derive:

$$y = AL^\alpha K^\beta F^\eta R^\lambda \tag{2}$$

where, F represents the FDI and R represents remittances.

After the log transformation of equation (2) we derive:

$$log\ y = A + \alpha\ log\ L + \beta\ log\ K + \eta\ log\ F + \lambda\ log\ R \qquad (3)$$

First difference of equation (3) changes it into growth form, which is as follows:

$$\alpha\ log\ y = c_0 + c_1\ \Delta\ log\ L + c_2\ \Delta\ log\ K + c_3\ \Delta\ log\ F + c_4\ \Delta log\ R + e \quad (4)$$

where, e is the random error term. Since the effect of current investment on the economic growth appears in the future as opposed to the current FDI we use one year lag of the FDI in our regression.

In equation (4) coefficients of both *log K* and *log L* are expected to be positive as any increase in capital and/or labor input increase the level of output. The coefficients of *log F* and *log R* may be positive or negative depending on whether foreign capital complements or substitutes domestic capital formation.

Because of lack of adequate data, this study is based on only four South Asian countries namely Bangladesh, India, Pakistan and Sri Lanka. Nepal and Bhutan are not included in the sample. A panel data from above mentioned countries from 1976 to 2010 is used. All of the data are derived from the World Development Report published by the World Bank.

4. ESTIMATION AND EMPIRICAL RESULTS

Since the use of non-stationary data can produce spurious results, it is important to test the stationary of the data series. To ensure the stationarity of the panel data, Levin *et al*. (2002), Breitung (2000), and Im *et al*. (2003) unit root tests are conducted. As reported in Table 3, all the data series are found to be nonstationary at level but are found stationary at the first difference level.

TABLE 3 - *Panel Unit Root Test*

	Levin, Lin & Chu		Breitung t-stat		Im, Pesaran & Shin	
Variable	Level	FD	Level	FD	Level	FD
log FDI	0.80	-8.60***	-1.72*	-2.52**	-3.16***	-11.60***
log K	0.13	-4.93***	-0.39	-1.60*	-0.36	-5.19***
log L	1.39	-11.40***	-1.52*	-6.59***	-0.09	-9.97***
log R	1.06	-0.05	1.43	-2.47***	0.05	-7.53***
log Y	0.49	-6.01***	2.17	-4.78***	2.56	-7.72***

Note: ***, **, * significant respectively at 1%, 5%, and 10% critical level.

After establishing the stationarity of the data series a cointegration test is conducted using Johansen's as well as Pedroni's panel cointegration test (Pedroni, 1999 and 2004). The test results are reported in Tables 4 and 5. Table 4 and 5 both reveal that the null hypothesis of no cointegration is rejected in both tests. Therefore following Engle and Granger (1987) equation (4) is estimated with error correction term. To ensure that the unobserved country-specific variables are not correlated with the right hand side variables the fixed effects estimator is used (see Kennedy, 2003, pp 303-305). The estimated result of equation (4) is reported in Table 6.

TABLE 4 - *Johansen Fisher Panel Cointegration Test*

H_0	Trace Test	Max. Eigen Test
r = 0	62.80***	44.03***
r ≤ 1	28.20***	16.30**
r ≤ 2	17.27**	10.47
r ≤ 3	13.98	9.88
r ≤ 4	13.93	13.93

Note: *** significant at 1 % critical level; ** significant at 5 % critical level.

TABLE 5 - *Pedroni's Cointegration Test*

Test Statistics	Statistics
Panel v – stat	0.29
Panel rho - stat	-2.81**
Panel PP – stat	-6.83***
Panel ADF – stat	-6.80***
Group rho – stat	-1.11
Group PP – stat	-4.87***
Group ADF – stat	-3.67***

Note: *** significant at 1 % critical level, ** significant at 5 % critical level.

In Table 6 the first column includes both foreign direct investment (F) as well as remittances (R) in addition to other variables. The second and third column report the estimation of the model respectively with only foreign direct investment (F) and remittances (R) with other explanatory variables. Since the model is estimated using panel data from different countries fixed effects,

estimation is used in order to capture the country specific effects. As seen in Table 6 the estimated results of all three version of the model are good in terms of the coefficient of determination, Durbin-Watson value and the F-statistics. The coefficients of variables also carry a theoretically consistent sign.

TABLE 6 - *Fixed Effect Estimation of Equation (4);*
Dependent Variable Δlog y

Variable	Model 1	Model 2	Model 3
$\Delta \log L$	-0.111	-0.041	-0.135
	(1.757)*	(1.96)*	(1.88)*
$\Delta \log K$	0.121	0.126	0.142
	(5.878)***	(5.49)***	(5.96)***
$\Delta \log F$	0.003	0.002	-
	(2.605)**	(1.41)#	
$\Delta \log R$	-0.017	-	-0.014
	(2.771)***		(2.03)**
EC	-0.043	-0.041	-0.035
	(3.92)***	(3.01)***	(2.74)**
Adj. R^{sq}	0.407	0.252	0.265
D.W	1.95	2.00	2.03
F Stat	12.23***	7.31***	7.74***
N	132	132	132

Note: Figures in the parentheses are the standard errors of coefficients of the corresponding variables.***, **, *, # represent significant at 1%, 5%, 10% and 20% critical level respectively.

One of the explanatory variables in the model is labor (L). Theoretically, a growth of the labor resource in a country should have a positive effect on real GDP growth. However, in our estimation we find that a growth in labor force has a negative effect in real GDP growth in all three estimation. This is somewhat counter intuitive. But one has to understand that South Asia is a labor abundant country where there is a plenty of surplus labor, particularly in the agricultural sector. In an excess labor and capital shortage countries like the ones in South Asia an increase in labor not only can have a decrease in marginal productivity, instead it can even have a negative effect on output. It is possible that the negative coefficient of labor (L) is indicating this phenomenon.

The coefficient of domestic capital (K) is positive and is statistically significant at more than 99% confidence level. The estimated coefficients from all three estimates indicate that a 10% increase in investment leads to more than 1% growth in real GDP in these countries. This finding is consistent with the theory that any increase in capital scarce country will have a very strong effect on the output growth.

As indicated above the main thrust of this paper is to estimate the effect of external capital namely, foreign direct investment (F) and remittances on economic growth. The effect of foreign direct investment (F) is found to be statistically significant in both estimations (in second estimation it is significant at 20% critical level). This finding is consistent with the theoretical expectation. But the coefficient of remittances (R) is found to be negative and statistically significant in both version of the model. This is contrary to the finding of Pradhan *et al*. (2008). The estimated results suggest that a 10% increase in remittances leads to at least 0.015% decline in real GDP growth. This finding is consistent with Chami *et al*. (2005) and Singh *et al*. (2009). There could be several reasons why the remittances could have a negative effect in South Asia. First, in South Asia remittances are usually either consumed or used to buy land, which does not help in capital formation and investment. Second, flow of foreign exchange through remittances could have a *Dutch Disease* problem leading to a decline in export and increase in import of consumption goods. Third, the *moral hazard problem* of reduced labor force participation: remittance money often works as insurance for the family members leading to less incentive to work which in the end leads to a reduction in the labor force participation (see Gubert, 2000). Fourth, *public moral hazard* problem, i.e. remittance inflow strongly reduces public spending in many developing countries which in turn can have a negative effect on the level of output in the economy (see Ebeke, 2012).

5. Summary and conclusion

This paper estimates the effect of external capital, namely foreign direct investment (F) and remittances (R) on economic growth in South Asia. A Cobb-Douglas type aggregate production function model is developed in which remittances and foreign direct investment are also added with the domestic capital (K) and Labor (L). A panel data is created using time series data from 1976 to

2009 for India, Pakistan, Bangladesh and Sri Lanka. Time series property of the panel data is diagnosed using panel unit root and panel cointegration tests, and error correction model is developed. In order to account for the country specific effect the model is estimated using fixed effect estimator.

The estimation of the model show an overall fit in terms of the coefficient, Durbin-Watson value and the F-statistics. All the variables in the model carry theoretically consistent signs. The overall results suggest that foreign direct investment (F) has a positive impact on economic growth whereas, remittances (R) have a negative impact on real GDP growth in South Asia. The possible reasons for the impact of remittances on the GDP growth could be a decline of export due to the *Dutch disease* and the possible *moral hazard* problem of reduced labor force participation as well as of the *public moral hazard* problem and its impact on the economy.

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ABSTRACT

This paper estimates the effect of FDI and remittances on economic growth in South Asia using an aggregate production function model. Time series data from 1976 to 2010 for India, Pakistan, Bangladesh and Sri Lanka is used to create the panel data. Time series properties of the panel data are diagnosed using panel unit root and panel cointegration tests and an error correction model is developed. The model is estimated using fixed effects estimator. The findings suggest that FDI has a positive effect on economic growth but remittances have a negative effect. A decrease in exports due to the Dutch Disease, a decrease in the labor force participation of the remittance receiving family, and public moral hazard problems could be possible reasons for the negative effect of remittances on economic growth.

Keywords: FDI, Remittances, South Asia, Panel Data, Error Correction Model

JEL Classification: D20, F3, F22

RIASSUNTO

Rimesse di denaro, Investimenti Diretti Esteri e crescita economica in Sud Africa: evidenze da dati panel

Questo studio stima l'effetto degli Investimenti Diretti Esteri e delle rimesse di denaro sulla crescita economica in Sud Africa utilizzando un modello di funzione di produzione aggregata con serie di dati *panel* del periodo 1976-2010 relativi a India, Pakistan, Bangladesh e Sri Lanka. Le proprietà dei dati di serie temporali sono analizzate tramite test di radice unitaria e di cointegrazione e viene sviluppato un modello *error correction*, per la stima del quale si utilizza uno stimatore a effetti fissi. I risultati suggeriscono che solo gli Investimenti Diretti Esteri hanno un effetto positivo sulla crescita economica. Una diminuzione nell'export dovuta al "morbo dell'olandese", una diminuzione nella partecipazione alla forza lavoro delle famiglie che ricevono rimesse e il problema dell'azzardo morale possono essere le ragioni dell'effetto negativo di queste ultime sulla crescita economica.